Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, MAY 2018

SUBJECT: SOLID STATE DRIVES [ELE 4011]

REVISED CREDIT SYSTEM

Time	e: 3 Hours	Date: 14 May 2018	Max. Marks: 50
Instructions to Candidates: Answer ALL the questions.			
	 Missing data may be suitably a 	issumed.	
1A.	With the help of speed-torque cha load.	racteristics, explain the four quadrant operation	tion of hoist 05
1B.	Derive the condition for the steady	state stability of an equilibrium point.	05
2A. 2B.	A 220 V, 1500 rpm, 11.6 A separate rectifier with an ac source voltage 2 Ω and 28.36 mH respectively. Calc A 30 kW, 230 V, 860 rpm, 144 A do three phase fully controlled rectifier conduction, calculate the speed for reversal).	ly excited motor is controlled by a 1-phase full of 230 V, 50 Hz. Armature resistance and ind culate the motor torque for $\alpha = 150^{\circ}$ and speed motor has an armature resistance of 0.07 Ω . r from an ac source of 170.3 V, 60 Hz. Assuming or $\alpha = 120^{\circ}$, T = 1.2 Nm (obtained by the f	y controlled luctance are = -640 rpm. 05 It is fed by a continuous ield current 05
3A. 3B.	A 220 V, 1500 rpm, 11.6 A separate of 2 Ω and 28.36 mH respectively. rectifier with controlled freewheeli operation and calculate the develop With a neat circuit schematic, plot to the source current for a Class B cho	ely excited motor has armature resistance and This motor is controlled by a single phase full ing. AC source voltage is 230 V, 50 Hz. Identify ped torque for $\alpha_n = 120^\circ$, $\alpha = 180^\circ$ and speed = the waveforms for armature voltage, armature opper along with the triggering sequence.	l inductance y controlled the mode of -1475 rpm. 05 current and 05
4A. 4B.	For a type A chopper circuit, source 600 μ s, load circuit parameters R = continuous. Calculate the value of minimum values of steady state our With the help of a suitable torque method of speed is best suited fo direction of rotation can be reverse induction motor.	e voltage is 220 V, chopping period is 2000 μ s, = 1 Ω , L = 5 mH and E = 24 V. Find whether load of average output current and also the mat tput current. e slip characteristics, explain why stator vol- r fan drive. Also, with a suitable schematic e ed while employing stator voltage control tech	on-period is ad current is ximum and 05 tage control explain how nique to an 05
5A. 5B.	Mention the advantages of direct technique. Draw the block schematic control application. With the help of a circuit schemat speed control can be achieved whe induction machine	t torque control technique over field orien ic of direct torque control technique for an indu ic, explain how sub synchronous and super s nile employing slip energy recovery scheme	ted control action motor <i>05</i> ynchronous to slip ring <i>05</i>